CLAIMS

1. An analytical apparatus, comprising:

an absorption/emission/scattering spectrum analyzer analyzing at least one of an absorption spectrum, an emission spectrum, and a scattering spectrum; and

a mass spectrum analyzer analyzing a mass spectrum,

wherein:

the absorption/emission/scattering spectrum analyzer and the mass spectrum analyzer carry out analysis on a single test sample; and

the mass spectrum analyzer includes ion introduction control means controlling a quantity of evaporated test sample ions.

2. The apparatus of claim 1, wherein the ion introduction control means is provided inside an ionization chamber of the mass spectrum analyzer.

3. The apparatus of either one of claims 1 and 2, wherein the ion introduction control means is adjusted in position using a position adjustment knob.

4. The apparatus of any one of claims 1 to 3, wherein the ion introduction control means is made of an electrically

non-conductive material.

5. The apparatus of any one of claims 1 to 4, wherein the ion introduction control means has a mesh structure.

6. The apparatus of claim 5, wherein the mesh structure has through holes ranging in diameter from 1 μm to 5 mm.

7. The apparatus of claim 1, wherein the absorption/emission/scattering spectrum analyzer analyzes at least one of an infrared absorption spectrum, a visible to ultraviolet absorption spectrum, a fluorescence spectrum, and a Raman scattering spectrum.

8. The apparatus of any one of claims 1 to 7, wherein the temperature of the test sample is controlled.

9. The apparatus of claim 1, wherein:

the mass spectrum analyzer is an electrospray ionization mass analyzer provided with a sprayer which applies high voltage for ionization and evaporation of a solution of the test sample; and

the mass spectrum analyzer includes: first cooling means cooling the test sample before the test sample is introduced to the absorption/emission/scattering spectrum

analyzer and to the mass spectrum analyzer; and second cooling means cooling the sprayer and the test sample introduced to the sprayer.

10. The apparatus of claim 9, wherein the second cooling means is a separate structure from the sprayer.

11. The apparatus of either one of claims 9 and 10, wherein the second cooling means cools at least an area including a high voltage applying section of the sprayer.

12. The apparatus of any one of claims 9 to 11, wherein the second cooling means is a gas introduction tube which ejects a cold inactive gas.

13. The apparatus of claim 12, wherein the cold inactive gas is ejected obliquely, at 30° to 60° to a direction in which a nebulizing gas is ejected, the nebulizing gas assisting the test sample to be ejected under the high voltage application.

14. The apparatus of either one of claims 12 and 13, wherein the cold inactive gas is ejected at a rate less than or equal to the rate at which the nebulizing gas is ejected, the rates being measured per unit area of respective ejection openings, the nebulizing gas assisting the test sample to be ejected under

the high voltage application.

15. The apparatus of any one of claims 9 to 14, wherein the first cooling means and the second cooling means are adapted so that the temperatures thereof is adjustable.

16. The apparatus of any one of claims 1 to 15, wherein the test sample is a reaction solution and completes reaction in a few seconds after the reaction starts.

17. An analytical method, comprising:

the absorption/emission/scattering spectrum analysis step of analyzing an absorption/emission/scattering spectrum of a test sample; and

the mass spectrum analysis step of controlling a quantity of test sample ions prepared by ionization and evaporation of the test sample, to analyze a mass spectrum,

wherein the absorption/emission/scattering spectrum analysis step and the mass spectrum analysis step are carried out substantially simultaneously and in real time.

18. The method of claim 17, wherein:

the ionization in the mass spectrum analysis step is electrospray ionization in which is used a sprayer which ionizes and evaporates a solution of the test sample under

high voltage application for mass spectrometry of the test sample;

said method comprising the first cooling step of cooling the solution before the absorption/emission/scattering spectrum analysis step and the mass spectrum analysis step; and the second cooling step of cooling the sprayer and the solution cooled in the first cooling step and introduced to the sprayer and applying high voltage to the sprayer to ionize and evaporate the solution; and

in the mass analysis step, mass spectrometry is carried out on the test sample cooled in the second cooling step.

19. The method of claim 18, wherein in the second cooling step, the sprayer is cooled before the test sample is introduced to the sprayer.

20. The method of any one of claims 17 to 19, wherein the test sample is stable only at -45°C or lower temperatures.

21. An electrospray ionization mass analyzer, comprising:

a sprayer applying high voltage to a test sample for ionization and evaporation;

first cooling means cooling the test sample before the test sample is introduced to the sprayer; and

second cooling means cooling the sprayer and the test

sample introduced to the sprayer.

22. The analyzer of claim 21, wherein the second cooling means is a separate structure from the sprayer.

23. The analyzer of either one of claims 21 and 22, wherein the second cooling means cools at least an area including a high voltage applying section of the sprayer.

24. The analyzer of any one of claims 21 to 23, wherein the second cooling means is a gas introduction tube which ejects a cold inactive gas.

25. The analyzer of claim 24, wherein the cold inactive gas is ejected obliquely, at 30° to 60° to a direction in which a nebulizing gas is ejected, the nebulizing gas assisting the test sample to be ejected under the high voltage application.

26. The analyzer of either one of claim 24 and 25, wherein the cold inactive gas is ejected at a rate less than or equal to the rate at which the nebulizing gas is ejected, the rates being measured per unit area of respective ejection openings, the nebulizing gas assisting the test sample to be ejected under the high voltage application.

27. The analyzer of any one of claims 21 to 26, wherein the first cooling means and the second cooling means are adapted so that the temperatures thereof is adjustable.

28. An electrospray ionization mass analysis method for analyzing the mass of a test sample using a sprayer which applies high voltage for ionization and evaporation of the test sample, comprising:

the first cooling step of cooling the test sample before the test sample is introduced to the sprayer;

the second cooling step of cooling the sprayer and the test sample cooled in the first cooling step and introduced to the sprayer and applying high voltage to the sprayer to ionize and evaporate the test sample; and

the mass spectrum analysis step of analyzing the mass of the test sample cooled in the second cooling step.

29. The method of claim 28, wherein in the second cooling step, the sprayer is cooled before the test sample is introduced to the sprayer.

30. The method of either one of claims 28 and 29, wherein the test sample is stable only at -45°C or lower temperatures.